

Patent Claims

1. Internal combustion engine for operation with at least two fuels of different knock resistances and having at least one cylinder in which the combustion of fuel takes place cyclically and a metering system (14) to supply to the cylinder in each cycle a quantity of air-fuel mixture regulated by way of a control signal, characterised in that the metering system (14) is designed to supply a first quantity of air-fuel mixture at a specific value of the control signal when using a fuel that is less knock resistant, this first quantity being smaller than the second quantity that is supplied at the same value of the control signal when using the more knock resistant fuel.
2. Internal combustion engine according to claim 1 characterised in that the metering system is designed to supply the smaller quantity of the less knock resistant mixture only under defined operating conditions of the engine and otherwise to supply either the more knock resistant mixture or the less knock resistant mixture in the same amount in each case.
3. Internal combustion engine according to claim 2 characterised in that the defined operating conditions correspond to a high speed range of the engine.
4. Internal combustion engine according to one of the previous claims characterised in that the metering system has at least two metering instructions and selects the instruction used to meter the air-fuel mixture on the basis of the respectively supplied fuel.

5. Internal combustion engine according to claim 4 characterised in that every metering instruction specifies a maximum quantity of the air-fuel mixture to be supplied as a function of the speed of rotation of the internal combustion engine.
6. Internal combustion engine according to one of the preceding claims characterised in that a valve arrangement (15, 20) with a plurality of inlets and a plurality of switching states in which a respective one of the inlets of the valve arrangement (15, 20) is connected to a supply line (23) of the engine (11), wherein the metering instruction used by the metering system (14) is coupled to the switching state of the valve arrangement (15, 20).
7. Internal combustion engine according to claim 6 characterised in that the valve arrangement comprises of a plurality of blocking elements (15, 20) that are located between the inlets and the supply line (23).
8. Internal combustion engine according to claim 7 characterised in that one of the blocking elements is a stop valve (15) and one is a pump (20).
9. Internal combustion engine according to one of claims 6 to 8 characterised in that the metering system (14) comprises a restriction (16) with a controllable cross section in the supply line.
10. Internal combustion engine according to claim 9 characterised in that the restriction (16) is a butterfly valve.

11. Internal combustion engine according to one of claims 6 to 8 characterised in that the metering system (14) comprises a charger in the supply line.
12. Internal combustion engine according to one of the previous claims characterised in that the engine is designed for use with gasoline and with natural gas.
13. Internal combustion engine according to one of the previous claims characterised in that the engine has a compression ratio of at least 11.5 but preferably of approximately 12.5 to 13.
14. Process for operation of an internal combustion engine in which one fuel is selected from at least two fuels possessing different knock resistances and a cylinder of the engine is cyclically supplied with regulated quantities of a mixture of air and fuel in dependence on a control signal, and is brought to combustion in the cylinder characterised in that the supplied quantity is further regulated, in dependence on the type of fuel supplied in the mixture, with the quantity supplied for a fuel with lower knock resistance, at least under defined operating conditions, being smaller than for a fuel with higher knock resistance at the same value of the control signal.
15. Process according to claim 14 characterised in that the process can be set optionally for the combustion of gasoline or natural gas in an engine with a compression ratio of at least 11.5, preferably approximately 12.5 to 13.